



# U.S. National Science Foundation Directorate for Biological Sciences (BIO)

Society for Integrative and Comparative Biology (SICB)  
Annual Meeting  
January 4, 2024

**Come meet  
with us at  
SICB!**

**NSF Booth #208  
open through  
Friday at 5pm.**

**Sign ups  
available for  
individual  
meetings with  
NSF staff.**

## **Integrative Organismal Systems (IOS)**

**Behavioral Systems** Colette St. Mary, Suzy Renn

**Developmental Systems** Anna Allen

**Neural Systems** Paul Forlano, Melissa Coleman

**Physiological and Structural Systems** Ted Morgan,  
Kathy Dickson, Miriam Ashley-Ross

**Plant Genome Research Program** dokamuro@nsf.gov

**Leadership** Denise Dearing, Michelle Elekonich

**Science Advisor** Julie Kellner

**Science Assistant** Liz Wenker

## **Molecular & Cellular Biosciences (MCB)**

**Genetic Mechanisms** Steve DiFazio



About NSF BIO

BIO Priorities

How to stay informed

General Q&A

Come Meet Us!





# Directorate for Biological Sciences (BIO)

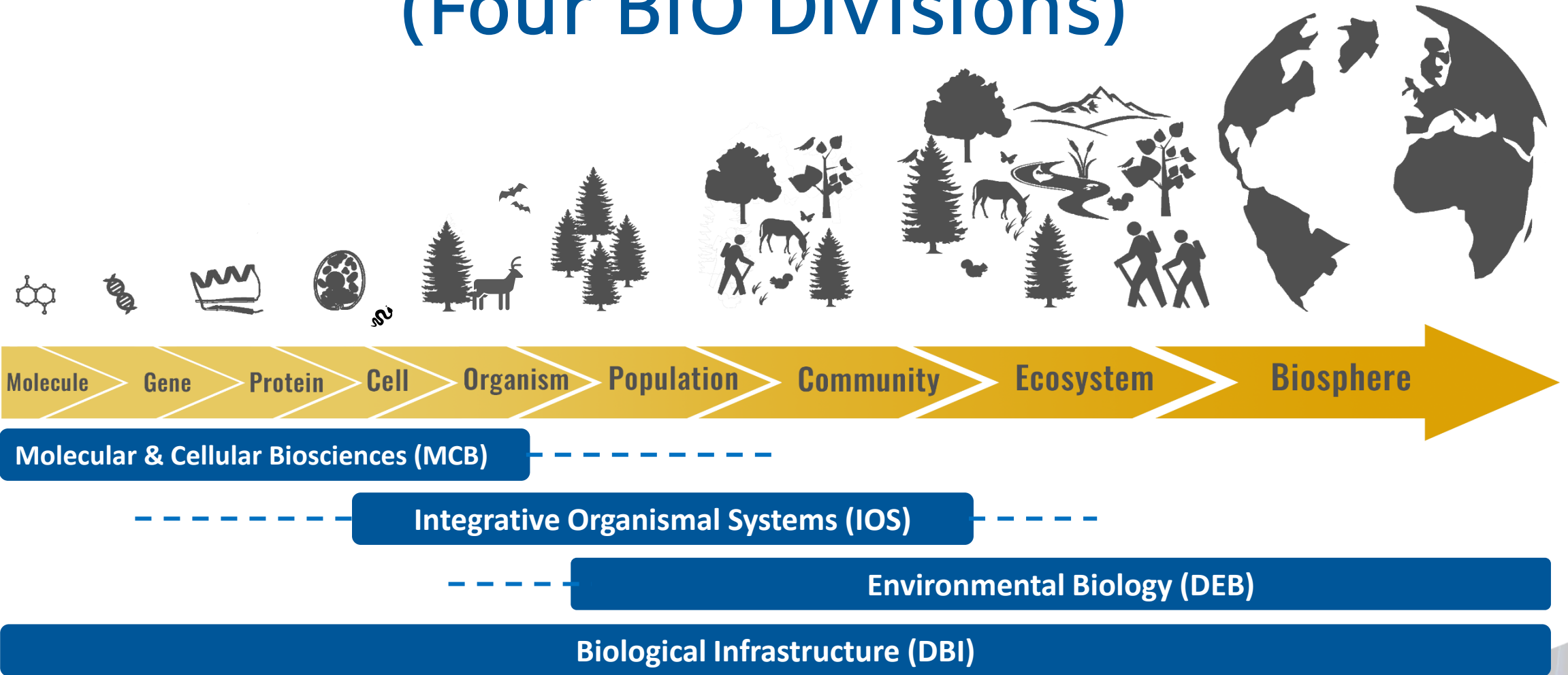
To enable discoveries for understanding life, advance the frontiers of biological knowledge, and provide a theoretical basis for prediction within complex, dynamic living systems through an integration of scientific disciplines.



<https://www.nsf.gov/bio/about.jsp>



# Biological Research Across Scales (Four BIO Divisions)



# Integrative Organismal Systems (IOS) Core Programs

## Behavioral Systems

Animal Behavior

## Developmental Systems

Plant, Fungal, and Microbial Developmental Mechanisms  
Animal Developmental Mechanisms  
Evolution of Developmental Mechanisms

## Neural Systems

Organization  
Activation  
Modulation

## Physiological and Structural Systems

Symbiosis, Infection, and Immunity  
Physiological Mechanisms & Biomechanics  
Integrative Ecological Physiology  
Plant Biotic Interactions (NSF-NIFA)

Plant Genome Research Program



# Molecular & Cellular Biosciences (MCB) Core Programs

Cellular Dynamics and Function

Genetic Mechanisms

Molecular Biophysics

Systems and Synthetic Biology



# Environmental Biology (DEB) Core Programs

Ecosystem Science

Evolutionary Processes

Population and Community Ecology

Systematics and Biodiversity Science





# IntBIO Integrative Research in Biology

## Track in BIO core programs (IOS, DEB, MCB)

Supports integrative biological research that spans sub-disciplines and incorporates cutting-edge methods, tools, and concepts from each to produce groundbreaking biological discovery that is synergistic, such that the sum is greater than the parts.

The research should produce a novel, holistic understanding of how biological systems function and interact across different scales of organization, e.g., from molecules to cells, tissues to organisms, species to ecosystems and the entire Earth.

Where appropriate, projects should apply experimental strategies, modeling, integrative analysis, advanced computation, or other research approaches to stimulate new discovery and general theory in biology.



# Biological Infrastructure (DBI)

## Human Resources

Postdoctoral Research Fellowships in Biology (PRFB)  
Research Coordination Networks in Undergraduate Biology Education (RCN-UBE)  
Research Experiences for Undergraduates (REU)  
Building Research Capacity for New Faculty in Biology (BRC-BIO)  
Research and Mentoring for Postbaccalaureates in Biological Sciences (RaMP)  
Research Experiences for Teachers Sites in Biological Sciences (BIORETS)  
Leading Culture Change through Professional Societies of Biology (BIO-LEAPS)

## Research Resources

Infrastructure Innovation for Biological Research (Innovation)  
Infrastructure Capacity for Biological Research (Capacity)  
Sustaining Infrastructure for Biological Research (Sustaining)  
Major Research Instrumentation Program (MRI)

## Centers, Facilities, and Additional Research Infrastructure

Biology Integration Institutes (BII)  
Center for Advancement of Synthesis of Open Environmental Data and Sciences  
Management of Operations and Maintenance of the National Ecological Observatory Network (NEON)  
Mid-scale Research Infrastructure-1 and 2



# National Ecological Observatory Network

81 field sites across 20 eco-climatic regions, including Alaska, Hawaii, and Puerto Rico

**Data Products, Education & Training** including data for teaching, data science workshops, and a code hub

**Research Support & Assignable Assets** to support community research incl. access to infrastructure.

<https://www.neonscience.org/>



# Long-Term Ecological Research Network

28 sites support ecological discovery on the influence of long-term and large-scale phenomena

40 years of data available

<https://lternet.edu/using-lter-data/>



**neon**  
Operated by Battelle



# BIO Priorities



Building a  
Resilient Planet



Advancing the  
Bioeconomy



Integration  
Across the  
Biological  
Sciences



Creating  
Opportunities  
Everywhere





# IOS Synthesis Center for Understanding Organismal Resilience

Establishes a center to advance our ability to explain and predict organismal resiliency and plasticity in response to complex and dynamic environmental circumstance encountered over a lifespan through the synthesis of varies data sets at multiple scales and levels.

Preliminary proposals due **January 12, 2024**

**Contact:** Anna Allen (here at SICB) or email [IOS-SynCenter@nsf.gov](mailto:IOS-SynCenter@nsf.gov)



# Building a Resilient Planet

Organismal Response to  
Climate Change  
(ORCC)

Biodiversity on a  
Changing Planet (BoCP)

Ecology and Evolution of  
Infectious Diseases  
(EEID)

Building Synthetic  
Microbial Communities  
for Biology, Mitigating  
Climate Change,  
Sustainability and  
Biotechnology  
(Synthetic  
Communities)

Dear Colleague Letter  
UKRI/BBSRC - NSF/BIO Lead Agency Opportunity  
in Biological Informatics, Systems  
Understanding of Host-Microbe Interactions,  
Synthetic Cells and Cellular Systems, and  
Synthetic Microbial Communities  
(NSF 23-143)

Dear Colleague Letter  
Organismal Systems  
and Infection Biology  
(OSIB)



# Advancing the Bioeconomy

THE WHITE HOUSE



SEPTEMBER 12, 2022

## Executive Order on Advancing Biotechnology and Biomanufacturing Innovation for a Sustainable, Safe, and Secure American Bioeconomy



► BRIEFING ROOM

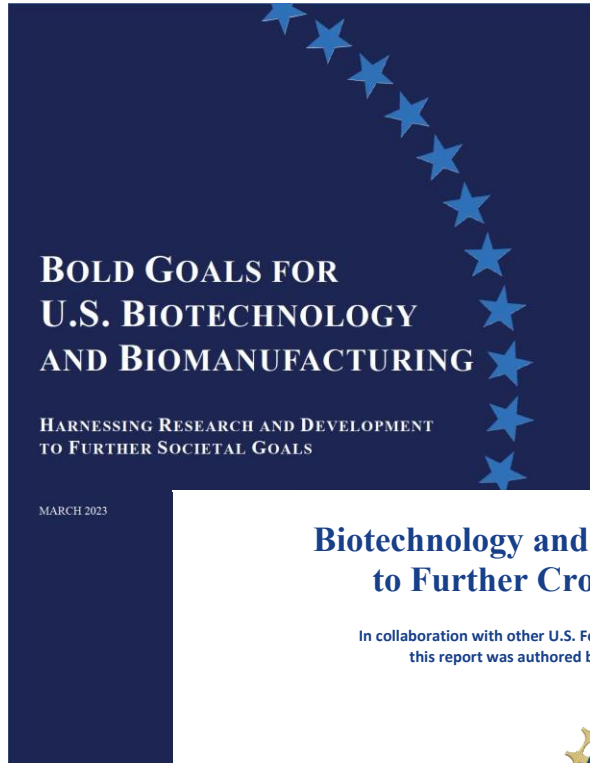
► PRESIDENTIAL ACTIONS

- Health
- Climate Change
- Energy
- Food Security
- Agriculture
- Supply Chain Resilience
- National and Economic Security



Advancing the  
Bioeconomy

# Advancing the Bioeconomy



## Biotechnology and Biomanufacturing R&D to Further Cross-Cutting Advances

In collaboration with other U.S. Federal Government departments and agencies,  
this report was authored by the U.S. National Science Foundation



- Health
- Climate Change
- Energy
- Food Security
- Agriculture
- Supply Chain Resilience
- National and Economic Security





# CASA Bio Catalyzing Across Sectors to Advance the Bioeconomy

Working to create a unified approach to advancing the U.S. bioeconomy across government, private sector, and research communities

Phase 1 – Stakeholders identify synergistic priorities

Phase 2 – Community input on areas of R&D exploration within priorities

How to get involved:

Phase 1: Visit [www.casa-bio.net](http://www.casa-bio.net)

Phase 2: April 2024 workshops in TBA



# NSF 24-023 DCL: Global Centers 2024 Program Competition

**Anticipated Topic:** Addressing Societal Challenges through the Bioeconomy

## Anticipated Priority Goals

Leveraging Biodiversity Across the Tree of Life to Power the Bioeconomy

Biofoundries (also called the Design-Build-Test-Learn process)



Advancing the  
Bioeconomy

# Integration Across the Biological Sciences

Enabling Discovery  
through GENomics  
(EDGE)

Dear Colleague Letter  
Bio Inspired Design  
(BIODesign)

Designing Synthetic  
Cells Beyond the  
Bounds of Evolution  
(Designer Cells)

Collaborative Research  
in Computational  
Neuroscience  
(CRCNS)

Joint DMS/NIGMS Initiative to  
Support Research at the Interface  
of the Biological and  
Mathematical Sciences  
(DMS/NIGMS)

Opportunities for  
Promoting Understanding  
through Synthesis  
(OPUS)

Transitions to Excellence  
in Molecular and Cellular  
Biosciences Research  
(Transitions)



# International Collaboration Opportunities

## NSF Office of International Science and Engineering (OISE)

- **AccelNet** Accelerating Research through International Network-to-Network Collaborations
- **GC** Global Centers
- **IRES** International Research Experiences for Students
- **PIRE** Partnerships for International Research and Education

### Examples of Current International Collaboration Dear Colleague Letters

Canada

Czech Republic

European Union

France

Germany

India

Ireland

Israel

Romania

Switzerland

Ukraine

United Kingdom



# Broadening Participation in STEM

The U.S. National Science Foundation is committed to expanding the opportunities in STEM to people of all racial, ethnic, geographic and socioeconomic backgrounds, sexual orientations, gender identities and to persons with disabilities.

## Funding search

Search All fields ▾ Search i

162 filtered results

[Export results .csv](#)

You can find active funding opportunities on this page. Or, [access archived opportunities](#) or [search funded awards](#).

Filter

[Reset all filters](#)

**Advancing diversity: Show only Programs included in NSF 'Broadening Participation Portfolio'** ✕

Limited submissions ▾

Award type ▾

Advancing diversity ▾

Directorate ▾

Division ▾

Education level ▾

☐ Show only NSF-wide/cross-directorate opportunities (27)





# Broadening Participation in STEM

## Example Programs

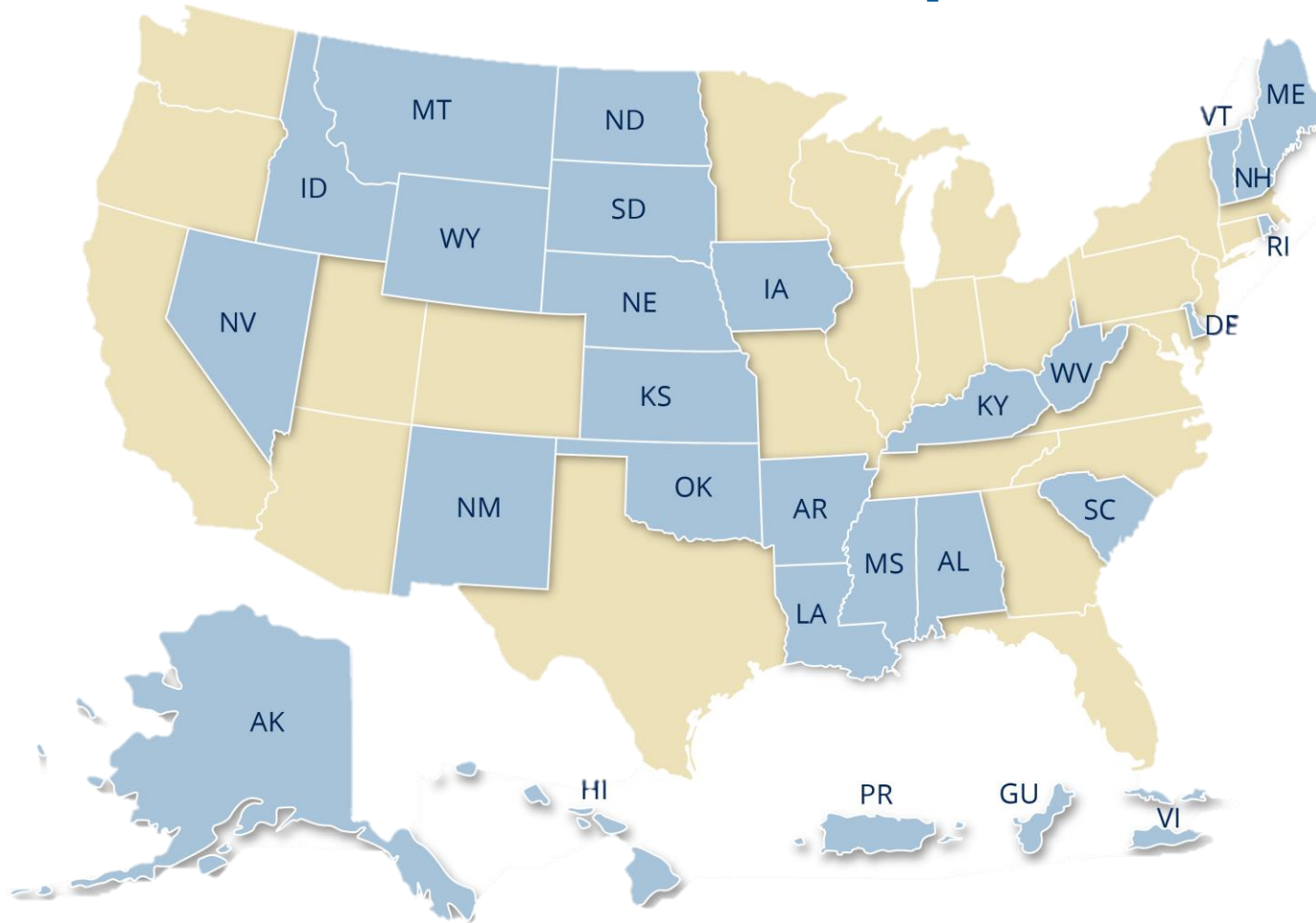
- **HBCU - EiR** Historically Black Colleges and Universities - Excellence in Research
- **HSI Program** Improving Undergraduate STEM Education: Hispanic-Serving Institutions
- **ADVANCE** Organizational Change for Gender Equity in STEM Academic Professions
- **INCLUDES** Inclusion across the Nation of Communities of Learners of Underrepresented Discoverers in Engineering and Science Initiative

## Example Dear Colleague Letters

- **STEM-APWD** STEM Access for Persons with Disabilities
- **RAHSS** Research Assistantships for High School Students: Funding to Broaden Participation in the Biological Sciences
- **VRS** Veterans Research Supplement Program



# EPSCoR Established Program to Stimulate Competitive Research

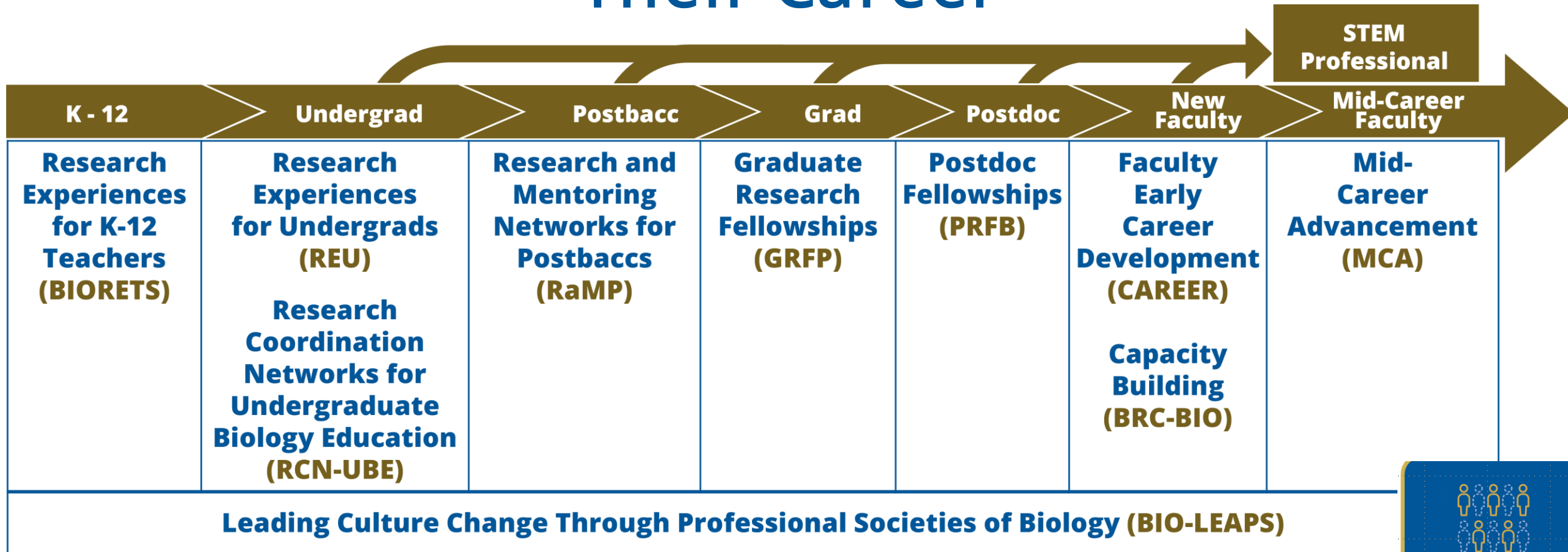


**AL** Alabama  
**AK** Alaska  
**AR** Arkansas  
**DE** Delaware  
**GU** Guam  
**HI** Hawaii  
**IA** Iowa  
**ID** Idaho  
**KS** Kansas  
**KY** Kentucky  
**LA** Louisiana  
**ME** Maine  
**MS** Mississippi  
**MT** Montana

**NE** Nebraska  
**NH** New Hampshire  
**NM** New Mexico  
**ND** North Dakota  
**NV** Nevada  
**OK** Oklahoma  
**PR** Puerto Rico  
**RI** Rhode Island  
**SC** South Carolina  
**SD** South Dakota  
**VI** U.S. Virgin Islands  
**VT** Vermont  
**WV** West Virginia  
**WY** Wyoming



# Supporting Researchers Throughout Their Career



# BRC-BIO Building Research Capacity of New Faculty in Biology

**Who:** Tenure-track assistant professors (within the first 3 years of their appointment) from MSIs, PUIs, and other non-R1 universities and colleges.

**What:** Provides support to initiate and build independent research programs. Projects should enable the establishment of sustainable research programs for faculty and enrich undergraduate research experiences to help grow the STEM workforce.



# ROA Research Opportunity Awards

**Who:** Faculty at PUIs (awarded  $\leq 20$  PhDs in last 2 years)

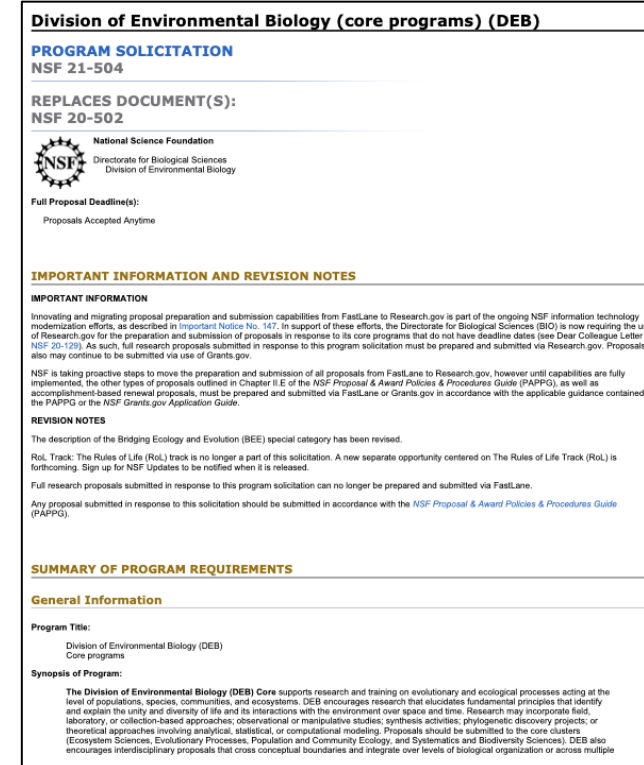
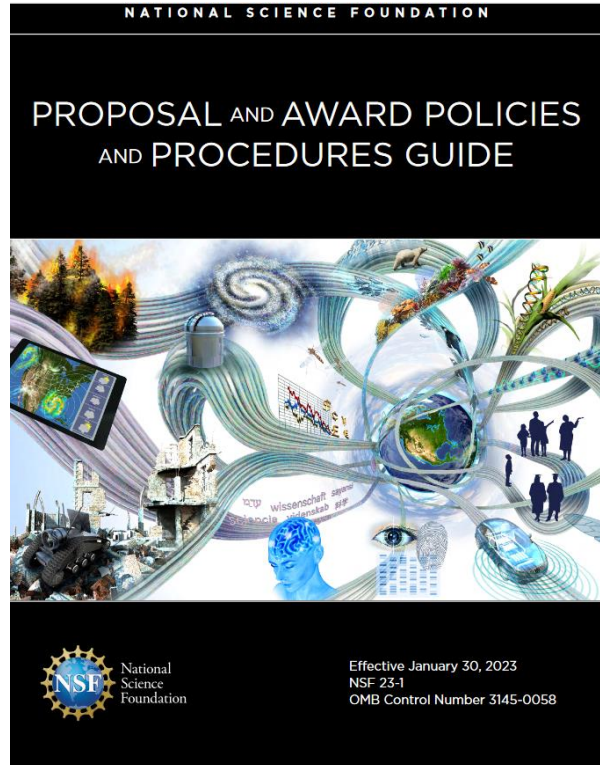
**What:** ROAs enable PUI faculty to pursue research as part of a collaborative research team as visiting scientists at other NSF-supported institutions.



Creating  
Opportunities  
Everywhere



# Essential Documents



**PAPPG**  
(new version effective  
Jan 30, 2024)

+

**Solicitation**



# Safe and Inclusive Work Environments Plan BIO/GEO pilot

For participating solicitations, a required 2-page supplement including\*:

1. a brief description of the field setting and unique challenges for the team;
2. the steps the proposing organization will take to nurture an inclusive off-campus or off-site working environment, including processes to establish shared team definitions of roles, responsibilities, and culture;
3. communication processes within the off-site team and to the organization(s) that minimize singular points within the communication pathway; and
4. the organizational mechanisms that will be used for reporting, responding to, and resolving issues of harassment if they arise.

**\*plan is in lieu of AOR certification when submitting to programs included in the pilot**



# BIO Virtual Office Hours (VOH)

Informational webinars focused on:

- New and ongoing funding opportunities
- Topics of general interest
- Open questions from audience to be answered live

## Dates & Times (all Eastern Time Zone)

Division of Biological Infrastructure – 3<sup>rd</sup> Tuesday from 3-4 p.m.

Division of Environmental Biology – 2<sup>nd</sup> Monday from 1-2 p.m.

Division of Integrative Organismal Systems – 3<sup>rd</sup> Thursday from 1-2 p.m.

Division of Molecular and Cellular Biosciences – 2<sup>nd</sup> Wednesday from 2-3 p.m.



# BIO Blogs

News, features, highlights, virtual office hour topics,  
and more from OAD and the BIO Divisions

BIO Buzz (OAD): <https://oadblog.nsfbio.com/>

DBInfo (DBI): <https://dbiblog.nsfbio.com/>

DEBrief (DEB): <https://debblog.nsfbio.com/>

IOS in Focus (IOS): <https://iosblog.nsfbio.com/>

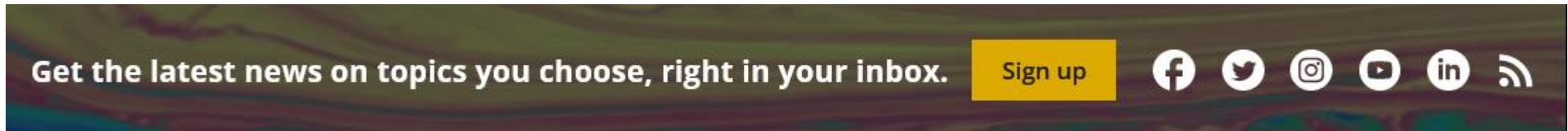
MCB Blog (MCB): <https://mcbblog.nsfbio.com/>



# BIO News and Updates

Sign-up for emails on new solicitations; events; due date reminders; and BIO's quarterly newsletter, including information on new priorities and solicitations, highlights from the community, and more!

Visit [www.nsf.gov](http://www.nsf.gov) and scroll down until you see the Sign up and social media banner, click on the yellow box, and follow the prompts.





# NSF Needs You!



Questions?  
Come meet  
with us at  
SICB!

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